Fermi National Accelerator Laboratory

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Wirebonding SVX Prime Silicon Ladders using the K&S 1478 Wirebonder

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WIREBONDING SVX PRIME SILICON LADDERS USING THE K&S 1478 WIREBONDER

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TM1858

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K&S 1478 REFERENCE GUIDE

POWER UP

1. Rotate counter-clockwise the dry nitrogen valve.

   A minimum of 60 psi is required for stable operation.

2. Install a test device onto the workholder.

   Used for calibration and setting bonding parameters.

3. Install, then align the workholder onto the X-Y table.

4. Lift the vacuum pump switch to **ON**.

5. Lift Main Breaker to **ON**.

   EMERGENCY STOP button shines. **ERROR** button shines (this does not mean there is an error).

6. Swing open the steel front panel that shields the front of the computer.

7. Lift the **+5 VDC** switch to **ON**.

   Display shows : *NO POWER*
   The CAL LED and P.R.S. LED are lit on the keyboard.

8. Press the reset switch (SW1) on the edge of the bonder MPU board.

   Display shows: *TESTING* (approx. 25-30 sec.), *SELFTEST* (tests RAM & PROMS, all MODE LED's are pulsed active) and then: *KILRAM?*

9. Close the front panel.

10. If *KILRAM* is **YES**, press the ACCEPT key.

    All program information is deleted.

11. Display shows: *NO POWER*

    Release the **EMERGENCY STOP** button.

12. The CAL LED and P.R.S. LED are lit on the keyboard.

    Display shows: *+THETA-0*

13. If *KILRAM* is **NO**, press the **ENTER** button.

    Current tool calibration and any programs taught are retained.

14. Display shows: *NO POWER*

    Release the **EMERGENCY STOP** button.

15. The CAL LED and P.R.S. LED are lit on the keyboard. Display shows: *+THETA-0*

16. If the bonding wire has to be threaded through the tool, skip to **THREADING THE WIRE THROUGH THE TOOL.**

TOOL CAL MODE

1. Press the CAL key on keyboard. A lit LED next to the CAL key denotes the active mode.

2. If accurate tool calibration information is already in memory: press the ACCEPT key to skip the tool calibration procedure.

3. If step 2 is not appropriate, continue the TOOL CALIBRATION procedure.

SET THETA ZERO

1. Display shows : *+THETA-0* The computer is ready to receive the theta zero position of the bond head.

2. If accurate theta zero information is already in memory, press the ACCEPT key.

3. If ACCEPT is not appropriate, see: MODEL 1478 VOLUME 1 OPERATION MANUAL 8.1.2 **SET THETA ZERO.**

CALIBRATE X-Y TABLE

1. Display shows: *+TBL SIZ* The computer is ready to receive information on the travel limits of the X-Y table.

2. If X-Y limits are already in memory, press the ACCEPT key.

3. If ACCEPT is not appropriate, press the **ENTER** button. The X-Y table travels to its four limits.The display shows *SEEKEDGE* during this period. It then travels to the table's X-Y center.

4. The display shows: *+*ENTER**

TOOL CALIBRATION

ADJUST FOCUS

1. The focus can be adjusted anytime. By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

ADJUST LIGHTING

1 If the SPECIAL FUNCTION key is pressed prior to the 0 (PRS LGH) key, the lighting on the device can be adjusted. This enhances the contrast for the best image viewing on the monitor.

2. Press the SPECIAL FUNCTION key, the 0 (PRS LGH) key and then the CHANGE key, to change the lighting pattern.

3. Press the ACCEPT key when the lighting is suitable.

4. If tool calibration is necessary, the workholder with a throwaway device must be installed onto the X-Y table.

5. Looking at the monitor, use the encoders to move the X-Y table to a blank area large enough to perform a tool calibration (the area within the four corners).

6. Press the **ENTER** button. The tool produces a 2nd bond footprint in the following order: 9, 6, 3 and 12 o'clock positions.

7. Displays shows: *+ CAL PT1*

8. Looking at the monitor, use the encoders to place the crosshair precisely over the center of the 9 o'clock position (the first calibration point).

9. Press the **ENTER** button. Display shows: *+ CAL PT2*

10. Looking at the monitor,	use the encoders to place the crosshair precisely over the center of the 6 o'clock position (the second calibration point).
11. Press the **ENTER** button.	Display shows: *+ CAL PT3*
12. Looking at the monitor,	use the encoders to place the crosshair precisely over the center of the 3 o'clock position (the third calibration point).
13. Press the **ENTER** button.	Display shows: *+ CAL PT4*
14. Looking at the monitor,	use the encoders to place the crosshair precisely over the center of the 12 o'clock position (the fourth calibration point).
15. Press the **ENTER** button.	
16. Display shows: *+EYE PT*	Press the CHANGE key until the second smallest "BOX" is shown on the monitor. Using the encoders, move the X-Y table until a area with contrast changes and lines in the X/Y axis are found within the selected "BOX". This will yield a good eyepoint.
17. Adjust the lighting if necessary.	Press the SPECIAL FUNCTION key, the 0 (PRS LGH) key and then the CHANGE key, to change the lighting pattern.
18. Press the ACCEPT key when the lighting is suitable.	
19. Press the **ENTER** button.	Display shows: *LEARNING* and then *SCALING* if the P R S accepted the eyepoint. This calibrates video pixels to X-Y table pulses (9 pulses = 1 mil in Z mode. 12.7 pulses = 1 mil in X or Y mode).

20. The display alternately shows: *+EYE PT*, the program identifier and *CAL DONE* if all TOOL CALIBRATION bonds were within an acceptable distance and if the angular tolerances were acceptable.

21. After a successful calibration, press the MANUAL mode key or,

22. Press the **EMERGENCY STOP** button. The button will shine, the Z rod solenoid can be heard latching and the servo motors have no power.

THREADING THE WIRE THROUGH THE TOOL

1. Press the MANUAL mode key. Confirm the MANUAL mode LED is lit.

2. Using the encoders, move the workholder from under the bonding tool.

CAUTION: do not leave the X-Y table at any X-Y stop limit. This can cause the machine to lockup. This is a fatal error.

3. Press the **EMERGENCY STOP** button. The button will shine, the Z rod solenoid can be heard latching and the servo motors have no power.

4. Manually turn the bonding head, to about the 8 o'clock position (or any convenient angle) from which to pull the wire from the bottom of the transducer through the heel/toe of the tool.

5. Press the OPEN CLAMP key on the keyboard one time. The OPEN CLAMP LED shines denoting the wire clamp is open. Place the bonding wire between the wire guides, then between the jaws of the clamp. The wire clamp will remain open for approximately 30 seconds and then automatically close to prevent the clamp solenoid from overheating. If the lit LED next to the OPEN CLAMP key goes off, the clamp has closed.

6. Leave a small length of wire, extending from the toe of the bonding tool. This will identify CAL PT 1 when preforming a TOOL CALIBRATION.

MANUAL MODE

Note: Bonding parameters can be changed while in MANUAL mode. However, the changes will have no effect on programs used during AUTO mode. If a parameter is changed while the computer is in TEACH mode or SEMI-AUTO mode, the changed parameter will be in effect during AUTO mode.

1. Press the MANUAL mode key. Confirm the MANUAL mode LED is lit.

2. Release the **EMERGENCY STOP** button. Display shows: *+BND PT 1*

3. Adjust the focus. By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

4. Adjust the lighting. Press the SPECIAL FUNCTION key,the 0 (PRS LGH) key and then the CHANGE key, to change the lighting pattern.

5. Press the ACCEPT key when the lighting is suitable.

6. Looking at the monitor, use the encoders to move the X-Y table so that bond point 1 is under the crosshair.

7. To display the loop height of the wires, Press the LOOP HEIGHT key. LOOP HEIGHT is different between the inner row and outer row. Consult the **LOG BOOK** for current parameters.

8. The current setting for the inner row is ###. Press # # # keys.

9. Display shows: *###*	Press the ACCEPT key.
10. Display shows: *! A 1D 1W*	Press the ONE DEVICE key.
11. Press the ACCEPT key.	
12. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . This is the contact velocity of the bonding head. The current setting for CVL is 6.
13. Press the 6 key.	Display shows: *6*
14. Press the ACCEPT key.	
15. Displays shows: *! A 1D 1W*	Press the ONE DEVICE key.
16. Display the loop profile.	Press the SPECIAL FUNCTION key and then the TIME (CLM) key. The loop profile can be changed by changing the point during the bonding cycle where the wire is clamped. Use the TER position.
17. Display shows: *% CLM TIP*	Press the CHANGE key until *TER* is displayed.
18. Display shows: *% TER*	Press the ACCEPT key.
19. Display shows: *+BND PT 1*	
20. Press the **ENTER** button.	Display shows: *+BND PT 2*
21. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 1.
22. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . This is the contact velocity of the bonding head. The current setting for CVL is 6.
23. Press the 6 key.	Display shows: *6*

24. Press the ACCEPT key. — Display shows: *+ BND PT 2*

25. Press the **ENTER** button. — The bonder will automatically bond one wire between the two points.

26. The crosshair on the monitor, — will return to the first bond to enable the operator to inspect the first bond.

27. Press the MWD (AUT/MAN) key. — The Missing Wire Detector system is automatically enabled during power-up. To confirm that MWD is enabled, press MWD (AUT/MAN) key.

28. Display shows: *% ON* — Press the ACCEPT key. MWD "learns" the bond parameters of the first 64 wires placed for evaluation of bond strength. MWD will also stop the bonding process in the AUTO mode should a wire not fit into the "learned" bonding parameters or not bond onto the pad at all.

TEACH THE WORKHOLDER THE LOAD POSITION

1. Release the **EMERGENCY STOP** button.
2. Confirm the MANUAL mode LED is lit.
3. Confirm the P.R.S. mode LED is lit.
4. Looking at the monitor, — use the encoders to place the crosshair precisely over the center of the first bond point.
5. Press the SPECIAL FUNCTION key — and then press the MWD (AUT/MAN) key.
6. Look at the display. — If the display shows *% MAN WH*, press the ACCEPT key.
7. If not, press the CHANGE key — until *% MAN WH* is in the display, then press the ACCEPT key.
8. Press the SPECIAL FUNCTION key — and then press the W/H TEACH key.

9. Display shows: *TEACH WH* for one second, then *+ UNLD PS*

10. Looking at the monitor, use the encoders to move the X-Y table to any desired position. **NOTE:** movement must be less than 10" of table travel.

11. Press the **ENTER** button. Display flashes *POS TAUT* for one second. The table moves to bond point 1.

12. Display shows: *+BND PT 1*

USING THE LOAD POSITION MANUALLY

1. To enable the load position feature, press: the SPECIAL FUNCTION key and then press the RECORD (IDX) key. If the display does not show *% IDX ON*, press the CHANGE key until it does.

2. Press the ACCEPT key.

3. Press the **INDEX** button. The workholder moves to the load position and stops.

4. Press the **INDEX** button. The workholder returns to the prior position and stops.

5. Select a operating mode. To enter into a operating mode press the key next to the mode desired. The LED is lit to confirm the active mode selected.

6. Latch down the **EMERGENCY STOP** button. The button will shine and the Z rod solenoid can be heard latching. Use this feature anytime to safely halt all operations.

TEACH MODE

1. Release the **EMERGENCY STOP** button.

2. Press the TEACH mode key. The LED is lit to confirm the active mode.

3. Confirm the P.R.S. mode is active. — Pattern Recognition System is active if LED is lit.

4. Display shows: *! CLR PRG* — Press the CLEAR key. All previous program information is deleted.

5. To save existing programs and bonding parameters see: **FLOPPY MODE**.

6. Display shows: — *% HYBRID*. If the display shows *% IC*, press the CHANGE key then press the ACCEPT key so that *%HYBRID* is displayed.

7. Adjust the lighting. — Press the SPECIAL FUNCTION key, the 0 (PRS LGH) key and then the CHANGE key, to change the lighting pattern.

8. Press the ACCEPT key when the lighting is suitable.

9. Adjust the focus. — By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

10. If the SPECIAL FUNCTION key is pressed — before Z ZERO (Focus) key is pressed, in any mode except CAL mode the automatic focus feature can be programmed. If the display shows *+XY0* before SPECIAL FUNCTION and Z ZERO (FOCUS) is pressed, all previously programmed focus levels will be changed.

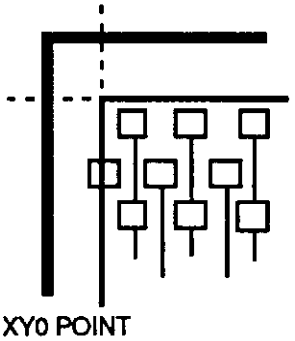
11. Press the ACCEPT key.

REFERENCE SYSTEMS

XY0 POINT

1. Display shows: *+XY0*

Looking at the monitor use the encoders to move the X-Y table so the crosshair on the monitor is positioned under the desired XY0 point. Use the ground trace on the left side of the 1st wafer. This is also the 1st operator reference point of reference system 1.



XY0 POINT

2. Press the **ENTER** button.

Display shows: *? RSYS* there are fourteen reference systems on a layer 1 device.

3. Press the 1 4 keys.

4. Press the ACCEPT key.

REFERENCE SYSTEM 1

1. Display shows: *?#PT 1*

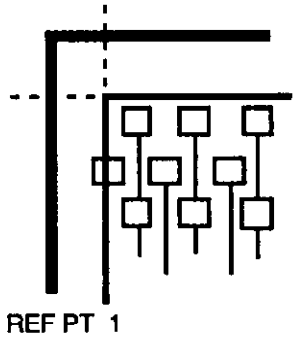
The computer is asking for the number of operator reference points in that will be taught for the first reference system. Use 2 reference points.

2. Press the number 2 key.

Display shows: *? 2 = 2*

3. Press the ACCEPT key.

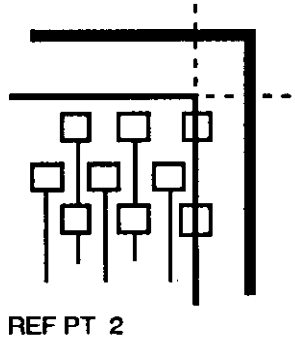
Display shows: *+REF PT1*
Enter the 1st operator reference point. Use the same reference point that was used for *XY0* for *REF PT1*.



REF PT 1

4. Press the **ENTER** button.

Display shows: *+REF PT2*
Looking at the monitor, use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the wafer.



REF PT 2

5. Enter the 2nd operator reference point.

6. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the reference system. This has already been defined.

7. Press the ACCEPT key.

8. Display shows: *? EYE 1*

The computer is asking to define how many eye points in the reference system. Use 2 eye points. Pattern Recognition System (P.R.S.).

9. Press the number 2 key.

10. Press the ACCEPT key.

Display shows: *+EYE PT1*

11. Press the CHANGE key.

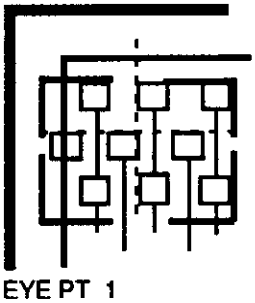
This will reduce the BOX. Use the 2nd smallest BOX.

12. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

13. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is inside the left corner of the wafer.



EYE PT 1

14. To evaluate the potential eyepoint:

press the **ERROR** button.

15. Display shows: *SCANNING*

When scanning is complete, the display flashes X = (plus a number) and then Y = (plus a number). The difference between X-Y is the quality number. The best eyepoints have two high numbers which are nearly identical.

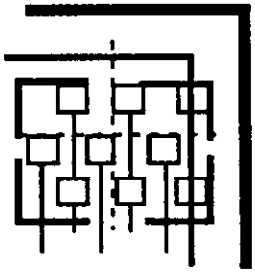
16. The display automatically returns to *+EYE PT1*

17. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

18. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

19. Press the CHANGE key.

This will reduce the BOX. Use the 2nd smallest BOX.

20. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 2

1. Display shows: *?#PT 2*

The computer is asking for the number of operator reference points in that will be taught for the second reference system. Use 2 reference points.

2. Press the number 2 key.

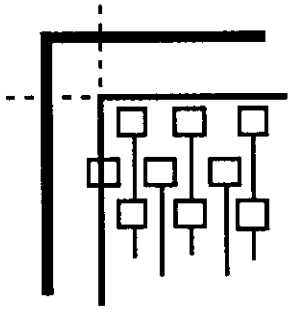
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



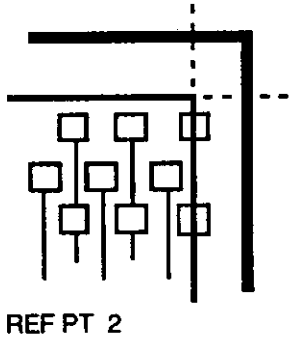
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

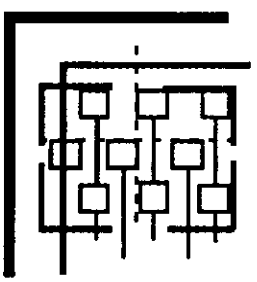
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



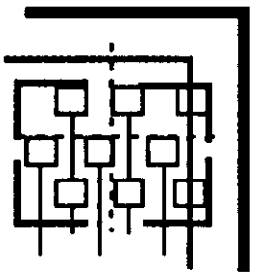
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 3

1. Display shows: *?#PT 3*

The computer is asking for the number of operator reference points in that will be taught for the third reference system. Use 2 reference points.

2. Press the number 2 key.

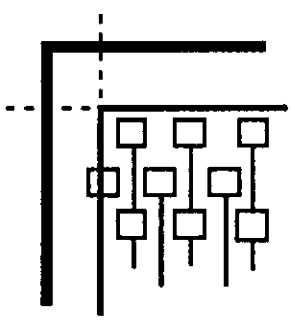
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



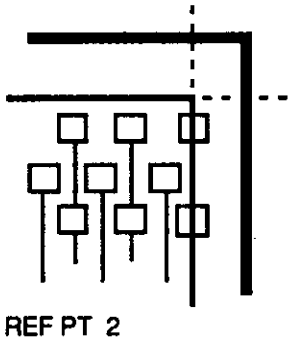
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the third reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

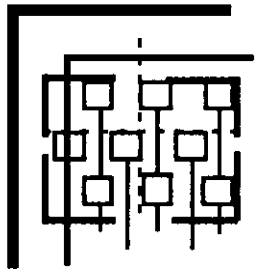
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



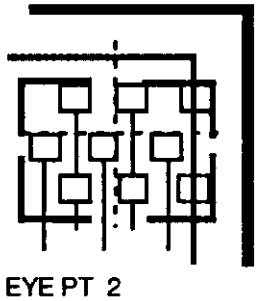
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 4

1. Display shows: *?#PT 4*

The computer is asking for the number of operator reference points in that will be taught for the fourth reference system. Use 2 reference points.

2. Press the number 2 key.

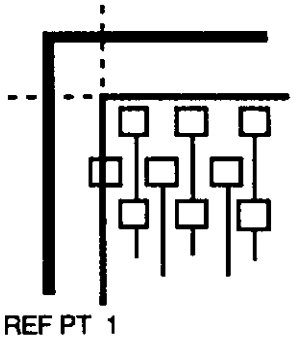
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



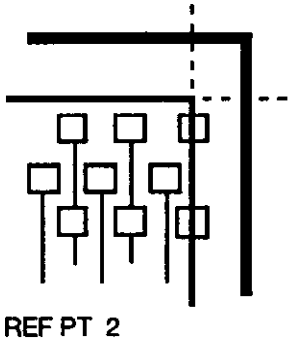
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the fourth reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

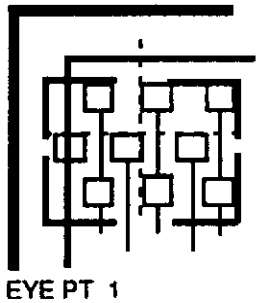
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



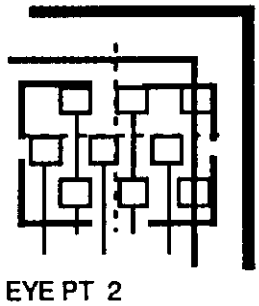
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 5

1. Display shows: *?#PT 5*

The computer is asking for the number of operator reference points in that will be taught for the fifth reference system. Use 2 reference points.

2. Press the number 2 key.

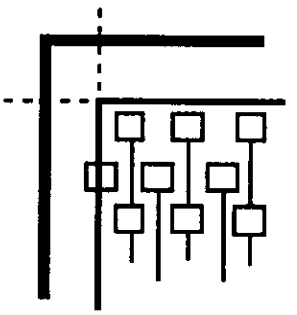
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



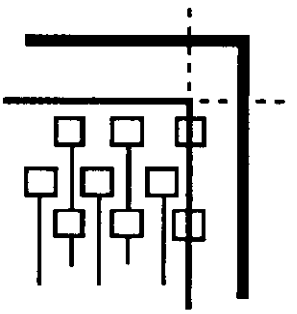
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the fifth reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

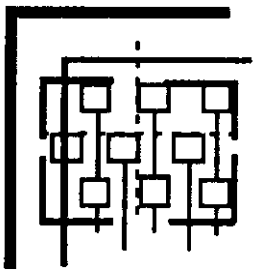
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



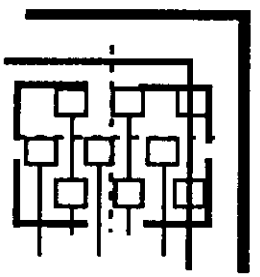
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 6

1. Display shows: *?#PT 6*

The computer is asking for the number of operator reference points in that will be taught for the sixth reference system. Use 2 reference points.

2. Press the number 2 key.

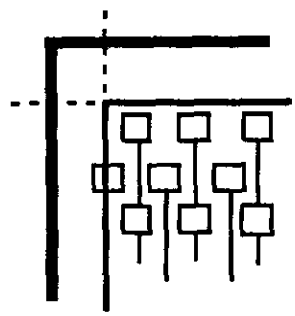
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



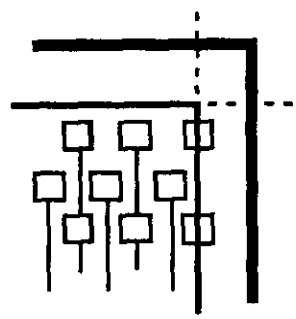
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the sixth reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

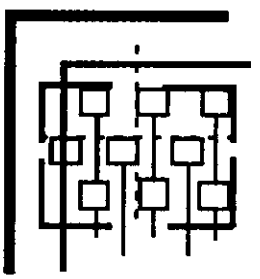
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



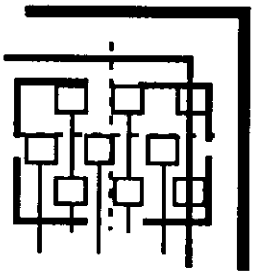
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 7

1. Display shows: *?# PT 7*

The computer is asking for the number of operator reference points in that will be taught for the seventh reference system. Use 2 reference points.

2. Press the number 2 key.

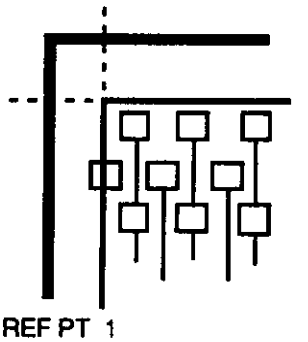
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+ REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



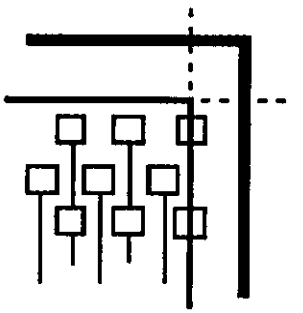
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the seventh reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

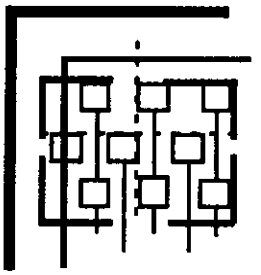
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



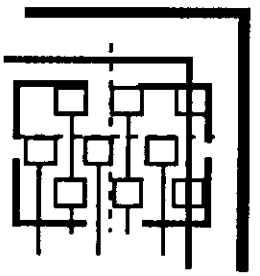
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 8

1. Display shows: *?#PT 8*

The computer is asking for the number of operator reference points in that will be taught for the eighth reference system. Use 2 reference points.

2. Press the number 2 key.

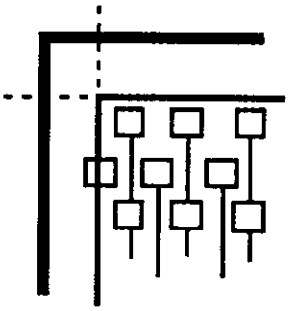
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



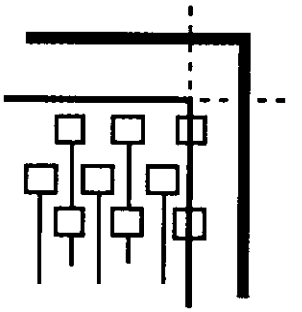
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the eighth reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE PT2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

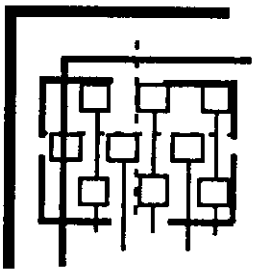
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



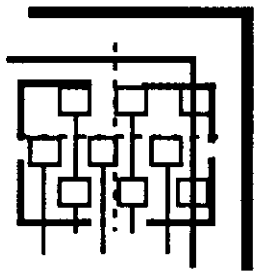
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 9

1. Display shows: *?#PT 9*

The computer is asking for the number of operator reference points in that will be taught for the ninth reference system. Use 2 reference points.

2. Press the number 2 key.

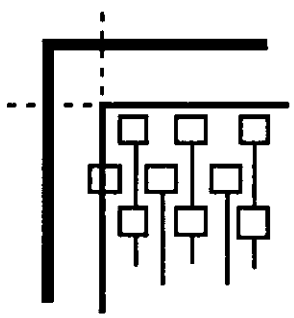
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



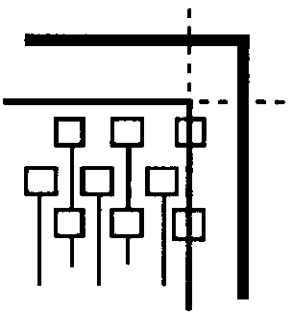
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the eighth reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

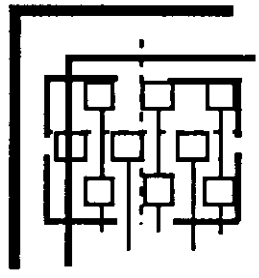
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



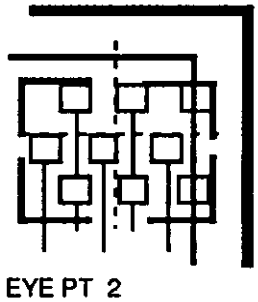
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 10

1. Display shows: *?#PT 10*

   The computer is asking for the number of operator reference points in that will be taught for the tenth reference system. Use 2 reference points.

2. Press the number 2 key.

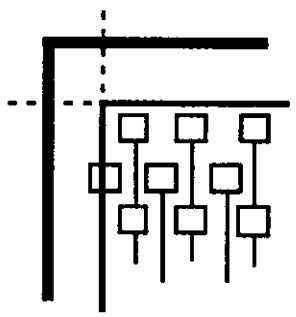
   Display shows: *? 2 = 2*

3. Press the ACCEPT key.

   Display shows: *+REF PT2*
   The computer is asking for the first operator reference point.

4. Looking at the monitor,

   use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



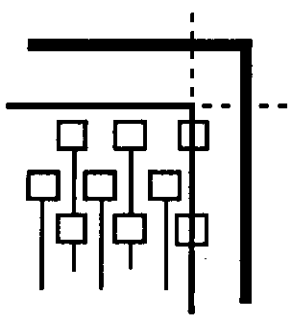
REF PT 1

5. Press the **ENTER** button.

   Display shows: *+REF PT2*
   The computer is asking for the second operator reference point.

6. Looking at the monitor,

   use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: % *DIE TOL*
The computer is asking for tolerance parameters for the tenth reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

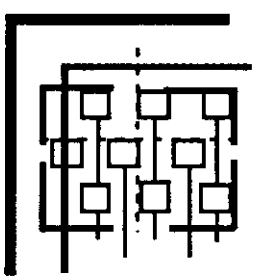
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



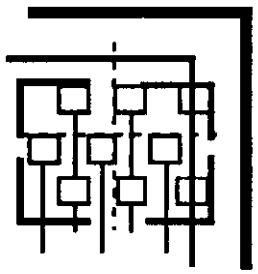
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the lower corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 11

1. Display shows: *?#PT 11*

The computer is asking for the number of operator reference points in that will be taught for the eleventh reference system. Use 2 reference points.

2. Press the number 2 key.

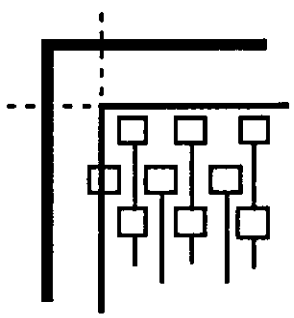
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



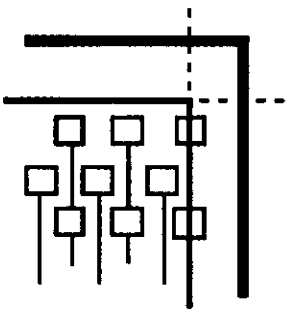
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the eleventh reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

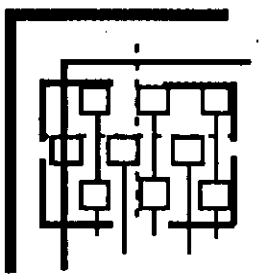
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



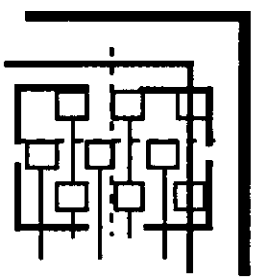
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 12

1. Display shows: *?#PT 12*

The computer is asking for the number of operator reference points in that will be taught for the twelfth reference system. Use 2 reference points.

2. Press the number 2 key.

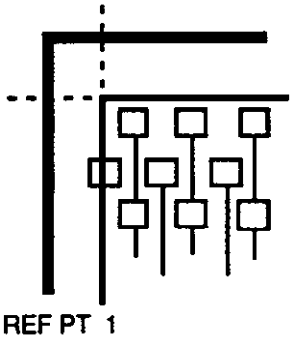
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



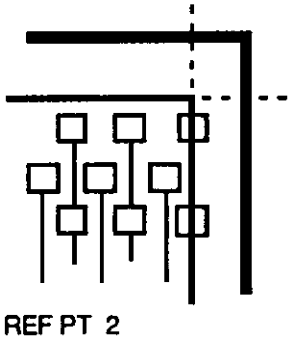
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the twelfth reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

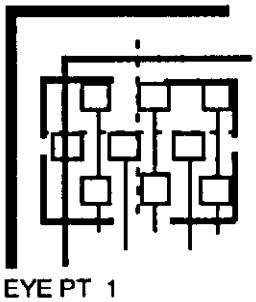
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



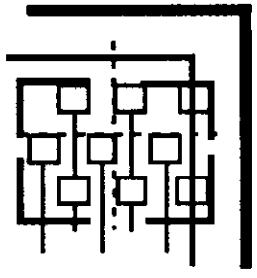
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 13

1. Display shows: *?#PT 13*

The computer is asking for the number of operator reference points in that will be taught for the thirteenth reference system. Use 2 reference points.

2. Press the number 2 key.

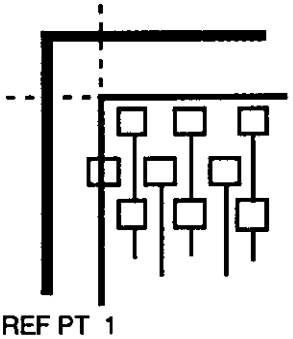
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



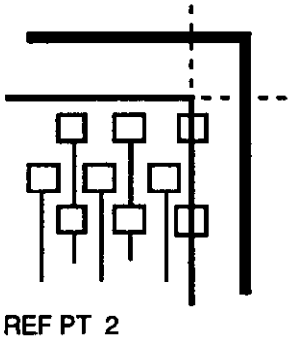
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the thirteenth reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

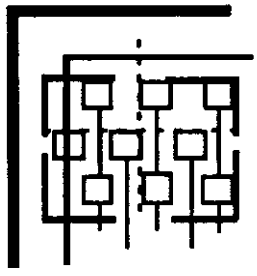
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



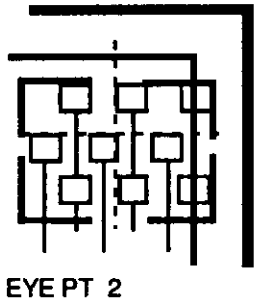
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

REFERENCE SYSTEM 14

1. Display shows: *?#PT 14*

The computer is asking for the number of operator reference points in that will be taught for the fourteenth reference system. Use 2 reference points.

2. Press the number 2 key.

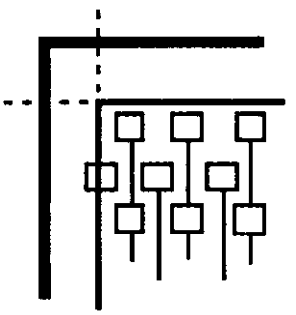
Display shows: *? 2 = 2*

3. Press the ACCEPT key.

Display shows: *+REF PT1*
The computer is asking for the first operator reference point.

4. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the left corner of the trace.



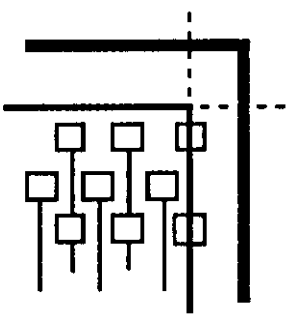
REF PT 1

5. Press the **ENTER** button.

Display shows: *+REF PT2*
The computer is asking for the second operator reference point.

6. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is at the right corner of the trace.



REF PT 2

7. Enter the 2nd operator reference point.

8. Press the **ENTER** button.

Display shows: *% DIE TOL*
The computer is asking for tolerance parameters for the twelfth reference system. This has already been defined.

9. Press the ACCEPT key.

10. Display shows: *? EYE 2*

The computer is asking to define how many eye points in the reference system. Use 2 eye points.

11. Press the number 2 key.

12. Press the ACCEPT key.

Display shows: *+EYE PT1*

13. Press the CHANGE key.

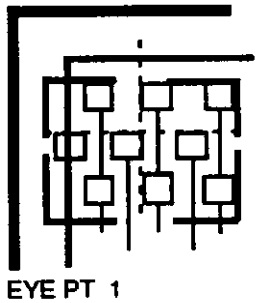
This will reduce the BOX. Use the 2nd smallest BOX.

14. Adjust the focus.

By pressing the number keys (0-9) when the "+" is on the display until the desired image sharpness is achieved. Half-step focus can be achieved by pressing the left upper most key on the keypad (un-marked) as necessary.

15. Looking at the monitor,

use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the left corner of the wafer.



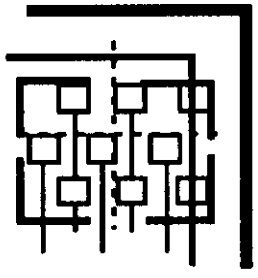
EYE PT 1

16. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

17. Display shows: *+EYE PT2*

Looking at the monitor, use the encoders to move the X-Y table so the BOX displayed on the monitor is just inside the right corner of the wafer.



EYE PT 2

18. Press the **ENTER** button.

Display shows: *LEARNING* while the X-Y table scans the area in the BOX.

INNER ROWS

REFERENCE SYSTEMS 1 & 3

1. Display shows: *?FRM*

Teach the from/to relationship of the wires. Press a number key that represents the reference system where the first bonds will be placed.

2. Press the 1 key,

then press the ACCEPT key. All wires on reference system one are first bonds.

3. Display shows: *?TO*

Press the 3 key, then the ACCEPT key. All wires on reference system three are second bonds.

4. Display shows: *+W 1.1*

The computer assumes that the "TO/FROM" relationship of wires and reference systems will be the same until changed. The plus sign means the X-Y table will be moved, the "W" means wire, the first numeral indicates the number of the wire to be bonded, and the second numeral indicates which bond (first(1) or second(2)) will be taught.

5. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 1.
6. To display the loop height of the wires,	Press the LOOP HEIGHT key. LOOP HEIGHT is different between the inner row and outer row. Consult the **LOG BOOK** for current parameters.
7. The current setting for the inner row is ###.	Press # # # keys.
8. Display shows: *###*	Press the ACCEPT key.
9. Display shows: *! A 1D 1W*	Press the ONE DEVICE key.
10. Press the ACCEPT key.	
11. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . The current setting for CVL is 6.
12. Press the 6 key.	Display shows: *6*
13. Press the ACCEPT key.	
14. Displays shows: *! A 1D 1W*	Press the ONE DEVICE key.
15. Display the loop profile.	Press the SPECIAL FUNCTION key and then the TIME (CLM) key. The loop profile can be changed by changing the point during the bonding cycle where the wire is clamped. Use the TER position.
16. Display shows: *% CLM TIP*	Press the CHANGE key until *TER* is displayed.
17. Display shows: *% TER*	Press the ACCEPT key.
18. Display shows: *+W 1.1*	
19. Press the **ENTER** button.	Display shows: *+w 1.2*

20. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 1.
21. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . This is the contact velocity of the bonding head. The current setting for CVL is 6.
22. Press the 6 key.	Display shows: *6*
23. Press the ACCEPT key.	
24. Press the **ENTER** button.	The bonding machine places the first wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.
25. Display shows: *+W 2.1*	
26. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 2.
27. Press the **ENTER** button.	Display shows: *+W 2.2*
28. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 2.
29. Press the **ENTER** button.	The bonding machine places the second wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

30. Display shows: *+W 3.1*

The display prompts the operator to teach each wire. Follow the prompt until reaching the bottom of the wafer. This is the end of reference systems 1 & 3.

REFERENCE SYSTEMS 5 & 7

1. Press the START DEVICE key.

Display shows: *?FRM*
Teach the from/to relationship of the wires. Press a number key that represents the reference system where the first bonds will be placed.

2. Press the 5 key,

then press the ACCEPT key. All wires on reference system five are first bonds.

3. Display shows: *?TO*

Press the 7 key, then the ACCEPT key. All wires on reference system seven are second bonds.

4. Display shows: *+W 1.1*

The computer assumes that the "TO/FROM" relationship of wires and reference systems will be the same until changed. The plus sign means the X-Y table will be moved, the "W" means wire, the first numeral indicates the number of the wire to be bonded, and the second numeral indicates which bond (first(1) or second(2)) will be taught.

5. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 1.

6. To display the loop height of the wires,

Press the LOOP HEIGHT key. LOOP HEIGHT is different between the inner row and outer row. Consult the **LOG BOOK** for current parameters.

7. The current setting for the inner row is ###.

Press # # # keys.

8. Display shows: *###*	Press the ACCEPT key.
9. Display shows: *! A 1D 1W*	Press the ONE DEVICE key.
10. Press the ACCEPT key.	
11. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . The current setting for CVL is 6.
12. Press the 6 key.	Display shows: *6*
13. Press the ACCEPT key.	
14. Displays shows: *! A 1D 1W*	Press the ONE DEVICE key.
15. Display the loop profile.	Press the SPECIAL FUNCTION key and then the TIME (CLM) key. The loop profile can be changed by changing the point during the bonding cycle where the wire is clamped. Use the TER position.
16. Display shows: *% CLM TIP*	Press the CHANGE key until *TER* is displayed.
17. Display shows: *% TER*	Press the ACCEPT key.
18. Display shows: *+W 1.1*	
19. Press the **ENTER** button.	Display shows: *+W 1.2*
20. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 1.
21. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . This is the contact velocity of the bonding head. The current setting for CVL is 6.
22. Press the 6 key.	Display shows: *6*
23. Press the ACCEPT key.	

24. Press the **ENTER** button.

The bonding machine places the first wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

25. Display shows: *+W 2.1*

26. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 2.

27. Press the **ENTER** button.

Display shows: *+w 2.2*

28. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 2.

29. Press the **ENTER** button.

The bonding machine places the second wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

30. Display shows: *+W 3.1*

The display prompts the operator to teach each wire. Follow the prompt until reaching the bottom of the wafer. This is the end of reference systems 5 & 7.

REFERENCE SYSTEMS 9 & 11

1. Press the START DEVICE key.

Display shows: *?FRM* teach the from/to relationship of the wires. Press a number key that represents the reference system where the first bonds will be placed.

2. Press the 9 key,

then press the ACCEPT key. All wires on reference system nine are first bonds.

3. Display shows: *?TO*	Press the 1 key twice, then the ACCEPT key. All wires on reference system eleven are second bonds.
4. Display shows: *+W 1.1*	The computer assumes that the "TO/FROM" relationship of wires and reference systems will be the same until changed. The plus sign means the X-Y table will be moved, the "W" means wire, the first numeral indicates the number of the wire to be bonded, and the second numeral indicates which bond (first(1) or second(2)) will be taught.
5. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 1.
6. To display the loop height of the wires,	Press the LOOP HEIGHT key. LOOP HEIGHT is different between the inner row and outer row. Consult the **LOG BOOK** for current parameters.
7. The current setting for the inner row is ###.	Press # # # keys.
8. Display shows: *###*	Press the ACCEPT key.
9. Display shows: *! A 1D 1W*	Press the ONE DEVICE key.
10. Press the ACCEPT key.	
11. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . The current setting for CVL is 6.
12. Press the 6 key.	Display shows: *6*
13. Press the ACCEPT key.	
14. Displays shows: *! A 1D 1W*	Press the ONE DEVICE key.

15. Display the loop profile.

Press the SPECIAL FUNCTION key and then the TIME (CLM) key. The loop profile can be changed by changing the point during the bonding cycle where the wire is clamped. Use the TER position.

16. Display shows: *% CLM TIP*

Press the CHANGE key until *TER* is displayed.

17. Display shows: *% TER*

Press the ACCEPT key.

18. Display shows: *+W 1.1*

19. Press the **ENTER** button.

Display shows: *+w 1.2*

20. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 1.

21. Display the contact velocity of the bonding head.

Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key.
Display shows: *4* .
This is the contact velocity of the bonding head. The current setting for CVL is 6.

22. Press the 6 key.

Display shows: *6*

23. Press the ACCEPT key.

24. Press the **ENTER** button.

The bonding machine places the first wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

25. Display shows: *+W 2.1*

26. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 2.

27. Press the **ENTER** button.

Display shows: *+w 2.2*

28. Looking at the monitor, use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 2.

29. Press the **ENTER** button. The bonding machine places the second wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

30. Display shows: *+W 3.1* The display prompts the operator to teach each wire. Follow the prompt until reaching the bottom of the wafer. This is the end of reference systems 9 & 11.

REFERENCE SYSTEMS 9 & 13

1. Press the START DEVICE key. Display shows: *?FRM* Teach the from/to relationship of the wires. Press a number key that represents the reference system where the first bonds will be placed.

2. Press the 9 key, then press the ACCEPT key. All wires on reference system nine are first bonds.

3. Display shows: *?TO* Press the 1 3 keys, then the ACCEPT key. All wires on reference system thirteen are second bonds.

4. Display shows: *+W 1.1* The computer assumes that the "TO/FROM" relationship of wires and reference systems will be the same until changed. The plus sign means the X-Y table will be moved, the "W" means wire, the first numeral indicates the number of the wire to be bonded, and the second numeral indicates which bond (first(1) or second(2)) will be taught.

5. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 1.
6. To display the loop height of the wires,	Press the LOOP HEIGHT key. LOOP HEIGHT is different between the inner row and outer row. Consult the **LOG BOOK** for current parameters.
7. The current setting for the inner row is ###.	Press # # # keys.
8. Display shows: *###*	Press the ACCEPT key.
9. Display shows: *! A 1D 1W*	Press the ONE DEVICE key.
10. Press the ACCEPT key.	
11. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . The current setting for CVL is 6.
12. Press the 6 key.	Display shows: *6*
13. Press the ACCEPT key.	
14. Displays shows: *! A 1D 1W*	Press the ONE DEVICE key.
15. Display the loop profile.	Press the SPECIAL FUNCTION key and then the TIME (CLM) key. The loop profile can be changed by changing the point during the bonding cycle where the wire is clamped. Use the TER position.
16. Display shows: *% CLM TIP*	Press the CHANGE key until *TER* is displayed.
17. Display shows: *% TER*	Press the ACCEPT key.
18. Display shows: *+W 1.1*	
19. Press the **ENTER** button.	Display shows: *+w 1.2*

20. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 1.
21. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . This is the contact velocity of the bonding head. The current setting for CVL is 6.
22. Press the 6 key.	Display shows: *6*
23. Press the ACCEPT key.	
24. Press the **ENTER** button.	The bonding machine places the first wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.
25. Display shows: *+W 2.1*	
26. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 2.
27. Press the **ENTER** button.	Display shows: *+ w2.2*
28. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 2.
29. Press the **ENTER** button.	The bonding machine places the second wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

30. Display shows: *+W 3.1*

The display prompts the operator to teach each wire. Follow the prompt until reaching the bottom of the wafer. This is the end of reference systems 9 & 13.

OUTER ROWS

REFERENCE SYSTEMS 2 & 4

1. Press the START DEVICE key.

Display shows: *?FRM*
Teach the from/to relationship of the wires. Press a number key that represents the reference system where the first bonds will be placed.

2. Press the 2 key,

then press the ACCEPT key. All wires on reference system two are first bonds.

3. Display shows: *?TO*

Press the 4 key, then the ACCEPT key. All wires on reference system four are second bonds.

4. Display shows: *+W 1.1*

The computer assumes that the "TO/FROM" relationship of wires and reference systems will be the same until changed. The plus sign means the X-Y table will be moved, the "W" means wire, the first numeral indicates the number of the wire to be bonded, and the second numeral indicates which bond (first(1) or second(2)) will be taught.

5. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 1.

6. To display the loop height of the wires,

Press the LOOP HEIGHT key. LOOP HEIGHT is different between the inner row and outer row. Consult the **LOG BOOK** for current parameters.

7. The current setting for the inner row is ###.	Press # # # keys.
8. Display shows: *###*	Press the ACCEPT key.
9. Display shows: *I A 1D 1W*	Press the ONE DEVICE key.
10. Press the ACCEPT key.	
11. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . The current setting for CVL is 6.
12. Press the 6 key.	Display shows: *6*
13. Press the ACCEPT key.	
14. Displays shows: *I A 1D 1W*	Press the ONE DEVICE key.
15. Display the loop profile.	Press the SPECIAL FUNCTION key and then the TIME (CLM) key. The loop profile can be changed by changing the point during the bonding cycle where the wire is clamped. Use the TER position.
16. Display shows: *% CLM TIP*	Press the CHANGE key until *TER* is displayed.
17. Display shows: *% TER*	Press the ACCEPT key.
18. Display shows: *+W 1.1*	
19. Press the **ENTER** button.	Display shows: *+ w1.2*
20. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 1.
21. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . This is the contact velocity of the bonding head. The current setting for CVL is 6.
22. Press the 6 key.	Display shows: *6*

23. Press the ACCEPT key.

24. Press the **ENTER** button.

The bonding machine places the first wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

25. Display shows: *+W 2.1*

26. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 2.

27. Press the **ENTER** button.

Display shows: *+w 2.2*

28. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 2.

29. Press the **ENTER** button.

The bonding machine places the second wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

30. Display shows: *+W 3.1*

The display prompts the operator to teach each wire. Follow the prompt until reaching the bottom of the wafer. This is the end of reference systems 2 & 4.

REFERENCE SYSTEMS 6 & 8

1. Press the START DEVICE key.

Display shows: *?FRM* teach the from/to relationship of the wires. Press a number key that represents the reference system where the first bonds will be placed.

2. Press the 6 key,

then press the ACCEPT key. All wires on reference system six are first bonds.

3. Display shows: *?TO*	Press the 8 key, then the ACCEPT key. All wires on reference system eight are second bonds.
4. Display shows: *+W 1.1*	The computer assumes that the "TO/FROM" relationship of wires and reference systems will be the same until changed. The plus sign means the X-Y table will be moved, the "W" means wire, the first numeral indicates the number of the wire to be bonded, and the second numeral indicates which bond (first(1) or second(2)) will be taught.
5. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 1.
6. To display the loop height of the wires,	Press the LOOP HEIGHT key. LOOP HEIGHT is different between the inner row and outer row. Consult the **LOG BOOK** for current parameters.
7. The current setting for the inner row is ###.	Press # # # keys.
8. Display shows: *###*	Press the ACCEPT key.
9. Display shows: *! A 1D 1W*	Press the ONE DEVICE key.
10. Press the ACCEPT key.	
11. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . The current setting for CVL is 6.
12. Press the 6 key.	Display shows: *6*
13. Press the ACCEPT key.	
14. Displays shows: *! A 1D 1W*	Press the ONE DEVICE key.

15. Display the loop profile.	Press the SPECIAL FUNCTION key and then the TIME (CLM) key. The loop profile can be changed by changing the point during the bonding cycle where the wire is clamped. Use the TER position.
16. Display shows: *% CLM TIP*	Press the CHANGE key until *TER* is displayed.
17. Display shows: *% TER*	Press the ACCEPT key.
18. Display shows: *+W 1.1*	
19. Press the **ENTER** button.	Display shows: *+w 1.2*
20. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 1.
21. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . This is the contact velocity of the bonding head. The current setting for CVL is 6.
22. Press the 6 key.	Display shows: *6*
23. Press the ACCEPT key.	
24. Press the **ENTER** button.	The bonding machine places the first wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.
25. Display shows: *+W 2.1*	
26. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 2.
27. Press the **ENTER** button.	Display shows: *+W 2.2*

28. Looking at the monitor, use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 2.

29. Press the **ENTER** button. The bonding machine places the second wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

30. Display shows: *+W 3.1* The display prompts the operator to teach each wire. Follow the prompt until reaching the bottom of the wafer. This is the end of reference systems 6 & 8.

REFERENCE SYSTEMS 10 & 12

1. Press the START DEVICE key. Display shows: *?FRM* teach the from/to relationship of the wires. Press a number key that represents the reference system where the first bonds will be placed.

2. Press the 1.0 keys, then press the ACCEPT key. All wires on reference system ten are first bonds.

3. Display shows: *?TO* Press the 1 2 keys, then the ACCEPT key. All wires on reference system twelve are second bonds.

4. Display shows: *+W 1.1* The computer assumes that the "TO/FROM" relationship of wires and reference systems will be the same until changed. The plus sign means the X-Y table will be moved, the "W" means wire, the first numeral indicates the number of the wire to be bonded, and the second numeral indicates which bond (first(1) or second(2)) will be taught.

5. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 1.
6. To display the loop height of the wires,	Press the LOOP HEIGHT key. LOOP HEIGHT is different between the inner row and outer row. Consult the **LOG BOOK** for current parameters.
7. The current setting for the inner row is ###.	Press # # # keys.
8. Display shows: *###*	Press the ACCEPT key.
9. Display shows: *! A 1D 1W*	Press the ONE DEVICE key.
10. Press the ACCEPT key.	
11. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . The current setting for CVL is 6.
12. Press the 6 key.	Display shows: *6*
13. Press the ACCEPT key.	
14. Displays shows: *! A 1D 1W*	Press the ONE DEVICE key.
15. Display the loop profile.	Press the SPECIAL FUNCTION key and then the TIME (CLM) key. The loop profile can be changed by changing the point during the bonding cycle where the wire is clamped. Use the TER position.
16. Display shows: *% CLM TIP*	Press the CHANGE key until *TER* is displayed.
17. Display shows: *% TER*	Press the ACCEPT key.
18. Display shows: *+W 1.1*	
19. Press the **ENTER** button.	Display shows: *+w 1.2*

20. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 1.
21. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . This is the contact velocity of the bonding head. The current setting for CVL is 6.
22. Press the 6 key.	Display shows: *6*
23. Press the ACCEPT key.	
24. Press the **ENTER** button.	The bonding machine places the first wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.
25. Display shows: *+W 2.1*	
26. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 2.
27. Press the **ENTER** button.	Display shows: *+w 2.2*
28. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 2.
29. Press the **ENTER** button.	The bonding machine places the second wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

30. Display shows: *+W 3.1*

The display prompts the operator to teach each wire. Follow the prompt until reaching the bottom of the wafer. This is the end of reference systems 10 & 12.

REFERENCE SYSTEMS 10 & 14

1. Press the START DEVICE key.

Display shows: *?FRM*
Teach the from/to relationship of the wires. Press a number key that represents the reference system where the first bonds will be placed.

2. Press the 1 0 keys,

then press the ACCEPT key. All wires on reference system ten are first bonds.

3. Display shows: *?TO*

Press the 1 4 keys, then the ACCEPT key. All wires on reference system fourteen are second bonds.

4. Display shows: *+W 1.1*

The computer assumes that the "TO/FROM" relationship of wires and reference systems will be the same until changed. The plus sign means the X-Y table will be moved, the "W" means wire, the first numeral indicates the number of the wire to be bonded, and the second numeral indicates which bond (first(1) or second(2)) will be taught.

5. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 1.

6. To display the loop height of the wires,

Press the LOOP HEIGHT key. LOOP HEIGHT is different between the inner row and outer row. Consult the **LOG BOOK** for current parameters.

7. The current setting for the inner row is ###.

Press # # # keys.

8. Display shows: *###*	Press the ACCEPT key.
9. Display shows: *! A 1D 1W*	Press the ONE DEVICE key.
10. Press the ACCEPT key.	
11. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . The current setting for CVL is 6.
12. Press the 6 key.	Display shows: *6*
13. Press the ACCEPT key.	
14. Displays shows: *! A 1D 1W*	Press the ONE DEVICE key.
15. Display the loop profile.	Press the SPECIAL FUNCTION key and then the TIME (CLM) key. The loop profile can be changed by changing the point during the bonding cycle where the wire is clamped. Use the TER position.
16. Display shows: *% CLM TIP*	Press the CHANGE key until *TER* is displayed.
17. Display shows: *% TER*	Press the ACCEPT key.
18. Display shows: *+W 1.1*	
19. Press the **ENTER** button.	Display shows: *+w 1.2*
20. Looking at the monitor,	use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 1.
21. Display the contact velocity of the bonding head.	Press the SPECIAL FUNCTION key and then the LOOP HEIGHT (CVL) key. Display shows: *4* . This is the contact velocity of the bonding head. The current setting for CVL is 6.
22. Press the 6 key.	Display shows: *6*
23. Press the ACCEPT key.	

24. Press the **ENTER** button.

The bonding machine places the first wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

25. Display shows: *+W 2.1*

26. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the first bond point of wire 2.

27. Press the **ENTER** button.

Display shows: *+w 2.2*

28. Looking at the monitor,

use the encoders to move the X-Y table so the crosshair displayed on the monitor is over the center of the second bond point of wire 2.

29. Press the **ENTER** button.

The bonding machine places the second wire. The crosshair returns to bond point 1 for inspection. Use the encoders to move the crosshair to examine bond point 2.

30. Display shows: *+W 3.1*

The display prompts the operator to teach each wire. Follow the prompt until reaching the bottom of the wafer. This is the end of reference systems 10 & 14.

31. Press the END key when all wires are placed.

Display flashes: the computer ID and *TAUGHT.*

32. Press a mode key or,

Press the **EMERGENCY STOP** button. The button will shine and the Z rod solenoid can be heard latching.

FLOPPY MODE

1. To save the program,	Press the **EMERGENCY STOP** button.
2. Place an unformatted disk in the disk drive and rotate the load/unload lever down.	
3. Press the FLOPPY key.	Display shows: *! PLY/REC*
4. Press the RECORD key.	Display shows: *BUSY* The computer is checking that the disk driver has power.
5. Display shows: *?PRGM ID*	Use numeral keys to identify the program.
6. Press the ACCEPT key.	Display shows: *RECORD'G* the program is being recorded onto the disk.
7. The display alternately flashes *PROGRAM RECORDED*	When the program has been copied onto the floppy disk. The program is also still in the computer until a new program is taught or the bonder is powered down.
8. Press a mode key or,	Press the **EMERGENCY STOP** button. The button will shine and the Z rod solenoid can be heard latching.